428 Rec'd PCT/PTO 25 SEP 2000

FORM PTO-1390 (Modified) (REV 10-95) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)
4296	09/646978

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP00/00402	January 27, 2000	January 28, 1999

TITLE OF INVENTION

LIGHT-EMITTING MATERIAL AND PRODUCING METHOD THEREOF

APPLICANT(S) FOR DO/EO/US 1) Qinglong HAO, 2) Pengcheng LI, 3) Qian XIU, 4) Atsushi OGURA and 5) Jingfeng GAO

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
    A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☒ Other items or information:

THE FEE CACULATION MUST BE BASED ON THE CLAIMS AS AMENDED AND ADDED IN THE ATTACHED PRELIMINARY AMENDMENT.

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/646978	PCT/JP00/00402	4296

20. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☒ Search Report has been prepared by the EPO or JPO	$840.00	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482)	$670.00	
☐ No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))	$760.00	
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO	$970.00	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)	$96.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =		840 .-
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).		

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	9 - 20 =	0	x $18.00	
Independent claims	1 - 3 =	0	x $78.00	
Multiple Dependent Claims (check if applicable).			☐	

TOTAL OF ABOVE CALCULATIONS =		840 .-
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). ☐		
SUBTOTAL =		
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +		
TOTAL NATIONAL FEE =		840 .-
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☒		40 .-
TOTAL FEES ENCLOSED =		880 .-
	Amount to be: refunded	$
	charged	$

☐ A check in the amount of to cover the above fees is enclosed.

☒ Please charge my Deposit Account No. 01-1944 in the amount of $880.00 to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 01-1944 A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Anderson, Kill & Olick P.C.
1251 Avenue of the Americas
New York, NY 10020-1182

(212) 278-1000

SIGNATURE

Eugene Lieberstein
NAME

24,645
REGISTRATION NUMBER

September 25, 2000
DATE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE MATTER OF:

APPLICANT: HAO et al

ORDER/DOCKET NO. 4296

FOR: LIGHT-EMITTING MATERIAL AND PRODUCING METHOD THEREOF

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
and Trademarks
Washington, DC 20231

S I R:

Please amend the application as follows.

IN THE CLAIMS

Please amend claim 8 as folllows:

Claim 8, line 2, delete "or 7"

Please add new claim 9 as follows:

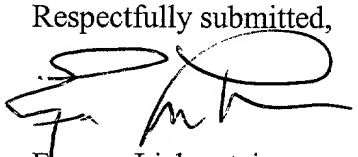
- - 9. A producing method of a light-emitting material according to claim 7, wherein in said step (2), reduction is carried out using carbon powder. - -

REMARKS

A Preliminary Amendment has been made to correct multiple dependent claim 8.

It is respectfully requested that the above amendment be entered before calculation of the filing fee and before examination by the Examiner.

Respectfully submitted,



Eugene Lieberstein
Registration No. 24645

ga0721ha.amd

Anderson, Kill & Olick, P.C.
1251 Avenue of the Americas
New York, NY 10020-1182
212/278-1000

SPECIFICATION

LIGHT-EMITTING MATERIAL AND PRODUCING METHOD THEREOF

TECHNICAL FIELD

The present invention relates to a light-emitting material and a producing method thereof, and more particularly, to an inorganic light-emitting material using a rare-earth element as an exciting agent and having an afterglow time and a producing method thereof.

BACKGROUND TECHNIQUE

A light-emitting material is utilized is mixed in ink or paint to make light emitting paint, and is utilized on a safe sign and a clock board. Conventionally, copper-excited zinc sulfide (ZnS: Cu) was widely used as the light-emitting material. ZnS: Cu has high light-emitting efficiency in the light-emitting spectral region, but its brightness is lowered extremely rapidly, and the visible afterglow time is as short as 20 to 30 minutes. When the ZnS: Cu is exposed to ultraviolet rays in areas exposed to moisture, decomposition and degeneration are generated and the body color of the material darkens. Therefore, there are constraints for using ZnS: Cu outside, and optimal material as a substitute for ZnS: Cu had long been required.

In CN1053807A, a light-emitting material ($m(Sr_{1-x}Eu)\,O \cdot nAl_2O_3\text{-}yB_2O_3$) having long afterglow ability and is laid open. In the above general formula, $1 \leqq m \leqq 5$, $1 \leqq n \leqq 8$, $0.005 \leqq y \leqq 0.35$ and $0.001 \leqq x \leqq 0.1$. The afterglow time of this light-emitting material is in a range from 10 to 20 hours.

In USP5,376,303, phosphor having long afterglow ability comprises a compound ($MO\ a\ (Al_{1-b}B_b)_2O_3 : cR$).

In this general formula, $0.5 \leqq a \leqq 10.0$, $0.0001 \leqq b \leqq 0.5$, $0.0001 \leqq c \leqq 0.2$, MO is a at least one compound selected from a group consisting of MgO, CaO, SrO and ZuO. R consists Eu and at least one additive rare-earth element selected from a

group consisting of Pr, Nd, Dy and Tm.

In the above-mentioned patent, some phosphors such as SrO. 2.10 $(A_{10.952}B_{0.048})_2O_3$: 0.005Eu, 0.020Dy (which will be referred to as "A" hereinafter), and $SrO._{1.025}(Al_{0.976}B_{0.024})_2O_3$: 0.005Eu, 0.015 Dy (which will be referred to as "B" hereinafter) were prepared, and residual light-emitting time and brightness of these phosphors were evaluated in view of afterglow time constant (n) and relative brightness (ZnS: Cu, Cl were evaluated). A measuring result shows that the afterglow time constants of A and B phosphors and ZnS: Cu, Cl are 0.94, 0.86 and 1.26, respectively, and phosphorus brightness after 10 seconds are 144, 220 and 100, respectively, and phosphorus brightness after 20 seconds are 934, 1320 and 100, respectively.

It is found that these materials are clearly improved as compared with ZnS: Cu, Cl, but they are not yet in practical use.

Thereupon, the present inventors conducted various researches for producing light-emitting material using rare-earth element Eu as the light-emitting material. Based on the researches, the present inventors found that a light-emitting material having a new crystallization structure was obtained by adding an appropriate amount of B and an additive exciting agent. This light-emitting material has a desired long afterglow time and high brightness.

Therefore, a first object of the present invention is to provide a light-emitting material having a long afterglow time and high brightness.

Moreover, a second object of the present invention is to provide a producing method of the above-mentioned light-emitting material.

DISCLOSURE OF THE INVENTION

To achieve the objects, the present invention provides the following light-emitting material and the producing method.

That is, a light-emitting material of the present invention includes a diplophase compound crystallization expressed in a general formula: $(Sr, Eu, Dy)_{0.95\pm x}(Al, B)_2O_{3\cdot 95\pm x}\cdot(Sr, Eu, Dy)_{4-x}(Al, B)_{14}O_{25-x}$ ($x=0.01 \sim 0.1$).

This diplophase compound has a new crystallization structure and consists of two phases, i.e., $(Sr, Eu, Dy)_{0.95\pm x}(Al, B)_2O_{3\cdot 95\pm x}$ and $(Sr, Eu, Dy)_{4-x}(Al, B)_{14}O_{25-x}$. This conclusion was obtained from XRD (X-ray diffraction) analysis using a Chinese geological university material scientific divisional crystallization structure and a large amount of samples carried out in a crystallization chemical laboratory. Based on the XRD analysis, and using an optical microscope and electronic probe analytical technique, it is corroborated that the above two phases are symbiosis and have light-emitting function.

The producing method of the light-emitting material includes the following steps:

(1) step for measuring previously pulverized raw materials, and mixing them to obtain a mixture of raw material,

(2) step for putting the mixture into a container, heating the mixture from 850℃ to 1200℃ for three hours under a reduction condition, keeping the temperature for five to six hours, thereby obtaining a sintered body,

(3) step for stopping the heating operation and cooling the sintered body nature down to a room temperature, and

(4) step for pulverizing the sintered body to obtain a product.

According to the light-emitting material and the producing method of the present invention, there is a light-emitting effect that which visible long afterglow ability as compared with a similar light-emitting material.

BEST MODE FOR CARRYING OUT THE INVENTION

In an assessment process concerning a phase of a light-emitting material of the present invention, using analytic means such as an X-ray fluorescent analysis, a plasma spectral analysis, electronic probe and X-ray photoelectron

energy spectrum, it was confirmed that a content of B element in diplophase compound is 0.2~1.0 % by weight in general, and variable ranges of contents of Eu element and Dy are from 0.5 to 3.0 % by weight and from 0.01 to 3.0 % by weight, respectively.

The element B exists in the entire crystallization structure. Moreover, the element B exists in a form of B-O tetrahedral coordination or BO_3 triangular coordination. The BO_3 Triangular coordination can substitute a portion of Al-O octahedron and this causes instability in the crystallization structure. This is an important structural feature of the light-emitting material of the present invention.

Further, the Al-O octahedron and Al-O tetrahedron concurrently exist in the diplophase compound crystallization of the present invention, and form a substantially hexagonal ring and positive ions of Sr, Eu and Dy are charged into a cavity of the ring. From the viewpoint of the entire crystallization diplophase compound, Al exists excessively and (Sr, Eu, Dy) are insufficient.

The raw materials which is used for the producing method of the light-emitting material of the present invention are $SrCO_3$, Al_2O_3, H_3BO_3, Eu_2O_3 and Dy_2O_3, of which, Eu3+ of Eu_2O_3 is reduced by Eu2+ during sintering process to excite the diplophase compound and provide the same with a light-emitting function. Dy_2O_3 strengthens the exciting effect of Eu_2O_3 as an additive exciting agent.

The term "reduction condition" used in the present invention means to reduce the above-mentioned mixed raw material using carbon powder, or to reduce the mixed raw material using mixture gas of nitrogen and hydrogen of volume ratio of 4:1. The light-emitting material produced by the invention has faint yellow-green color. When this light-emitting material is irradiated with sunlight, a fluorescent light or the other artificial light source and excited, the main peak of the light-emitting spectrum is 505μm, and shows

blue or green.

As a result of measurement of samples, it was found that the light-emitting material of the present invention showed brightness of about 8500mcd/m^2 after five seconds from the instant when the irradiation was stopped, and visible afterglow time was 80 hours or longer (see Table 1). As shown in Table 1, the light-emitting material produced by the method of the present invention has especially excellent visible afterglow time.

The brightness is measured by the following method. That is, 0.2g of sample is put in a plastic plate of 10mm diameter and it is irradiated for 15 minutes from a perpendicular distance of 20cm using a fluorescent light of 15w at a room temperature and under humidity of 25RH%, and brightness of each sample is measured at various time points using an luminance meter (TOPCONBM-5, Japan TOPCON Inc.).

The light-emitting material produced by the method of the present invention has apparently long afterglow time in comparison with similar other products. Therefore, this material can suitably be applied to articles or safe sign which need to be seen in the dark, for example, a fireplug of a fire extinguishing tools and material, a handrail of safe stairs, and a road.

The following embodiments are for explaining the present invention in more detail, and are for limiting the invention.

[First Embodiment]

Previously pulverized 372.89g of $SrCO_3$, 220.32g of Al_2O_3, 12.616g of H_3BO_3, 2.42g of Eu_2O_3, and 0.157g of Dy_2O_3 were measured and sufficiently mixed. The mixed raw material was put into a container and it was covered with carbon powder, and heated from 850℃to 1200℃ for three hours to increase it temperature, and the temperature was maintained for six hours. Then, the mixture was naturally cooled down to a room temperature to obtain a sintered body. The obtained sintered body was pulverized into such small pieces that all the pieces could pass through 200 mesh, thereby obtaining a product.

The product obtained in this manner had initial brightness of 3850mcd/m^2 for 30 seconds and afterglow time was 85 hours. In the obtained produce, a value of x in the general formula was 0.01.

[Second Embodiment]

Previously pulverized 409.79g of $SrCO_3$, 220.32g of Al_2O_3, 12.616g of H_3BO_3, 2.96g of Eu_2O_3, and 0.164g of Dy_2O_3 were measured and sufficiently mixed. The mixed raw material was put into a container and it was covered with carbon powder, and heated from 850℃ to 1000℃ for three hours to increase it temperature, and the temperature was maintained for six hours. Then, the mixture was naturally cooled down to a room temperature to obtain a sintered body. The obtained sintered body was pulverized into such small pieces that all the pieces could pass through 200 mesh, thereby obtaining a product.

The product obtained in this manner had initial brightness of 3990mcd/m^2 for 30 seconds and afterglow time was 80 hours.

In the obtained produce, a value of x in the general formula was 0.01.

Table 1

Measurement of brightness (mcd/m^2) and calculation of standard deviation

Time	Sample No.					Calculation of standard deviation		
	1	2	3	4	5	Average value	Standard deviation	Relative standard deviation
5 s	8400	8450	8400	8500	8500	8430	45	0.5%
10 s	7380	7570	7420	7410	7320	7460	125	1.8%
20 s	5120	5130	4930	5170	4870	5044	135	2.7%
30 s	4030	3960	3850	3990	3820	3930	91	2.3%
40 s	3380	3230	3160	3310	3110	3238	110	3.4%
60 s	2550	2490	2430	2490	2420	2476	53	2.1%
90 s	1870	1820	1780	1830	1750	1810	47	2.6%
3min	1520	1470	1460	1480	1420	1470	36	2.4%
4 min	870	850	840	840	820	844	18	2.1%
5 min	760	740	720	730	700	730	22	3.0%
3 min	630	630	610	610	590	614	17	2.8%
15 min	330	310	300	310	290	308	15	4.9%
30 min	160	150	140	140	130	144	15	8.3%
60 min	70	70	60	60	60	64	5.5	8.6%
90 min	50	40	40	50	40	44	5.5	12.5%
120 min	40	40	30	40	30	36	5.5	15.3%
180 min	20	30	20	20	20	22	4.5	20.5%
240 min	20	20	10	20	20	18	4.5	25.0%
360 min	20	10	10	20	10	14	5.5	33.6%
480 min	10	10	10	10	10	10	0	0

WHAT IS CLAIMED IS:

1. A light-emitting material including diplophase compound that is expressed in the following general formula:
$(Sr, Eu, Dy)_{0.95\pm x}(Al, B)_2O_{3.95\pm x}$-$(Sr, Eu, Dy)_{4-x}(Al, B)_{14}O_{25-x}$
(in the formula, x=0.01 to 0.1, a content of B element is 0.2 to 1.0 % by weight, a content of Eu is 0.5 to 3.0 % by weight and a content of Dy is 0.1 to 3.0 % by weight).

2. A light-emitting material according to claim 1, wherein said diplophase compound comprises symbiotical phase $(Sr, Eu, Dy)_{0.95\pm x}(Al, B)_2O_{3.95\pm}$ from $(Sr, Eu, Dy)_{4-x}(Al, B)_{14}O_{25-x}$.

3. A light-emitting material according to claim 1, wherein Al-O tetrahedron and Al-O octahedron concurrently exist in said diplophase compound.

4. A light-emitting material according to claim 1, wherein BO_3 triangular arrangement substitute a part of Al-O octahedron in said diplophase compound.

5. A light-emitting material according to claim 1, wherein boron exists entirely in said diplophase compound crystalline.

6. A producing method of a light-emitting material of claim 1, comprising

(1) step for measuring previously pulverized raw materials, and mixing them to obtain a mixture of raw material,

(2) step for putting the mixture into a container, heating the mixture from 850℃ to 1200℃ for three hours under a reduction condition, keeping the temperature for five to six hours, thereby obtaining a sintered body,

(3) step for stopping the heating operation and cooling the sintered body nature down to a room temperature, and

(4) step for pulverizing the sintered body to obtain a product.

7. A producing method of a light-emitting material according to claim 6, wherein said previously pulverized raw materials are $SrCO_3$, Al_2O_3, H_3BO_3, Eu_2O_3 and Dy_2O_3.

8. A producing method of a light-emitting material according to claim 6 or 7, wherein in said step (2), reduction is carried out using carbon powder.

ABSTRACT OF THE DISCLOSURE

A light-emitting material of the present invention includes diplophase compound that is expressed in the following general formula: $(Sr, Eu, Dy)_{0.95\pm x}(Al, B)_{203.95\pm x} \cdot (Sr, Eu, Dy)_{4-x}(Al, B)_{14}O_{25-x}$ (in the formula, x=0.01 to 0.1, a content of B element is 0.2 to 1.0 % by weight, a content of Eu is 0.5 to 3.0 % by weight and a content of Dy is 0.1 to 3.0 % by weight). A producing method of a light-emitting material of the present invention comprises (1) step for measuring previously pulverized raw materials, and mixing them to obtain a mixture of raw material, (2) step for putting the mixture into a container, heating the mixture from 850℃ to 1200℃ for three hours under a reduction condition, keeping the temperature for five to six hours, thereby obtaining a sintered body, (3) step for stopping the heating operation and cooling the sintered body nature down to a room temperature, and (4) step for pulverizing the sintered body to obtain a product. In the step (2), reduction is carried out using carbon powder.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER
4296

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

LIGHT-EMITTING MATERIAL AND PRODUCING METHOD THEREOF

the specification of which (check only one item below):

☒ is attached hereto.

☐ was filed as United States application

Serial No. _____

on _____,

and was amended

on _____ (if applicable).

☐ was filed as PCT international application

Number _____

on _____,

and was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowlege the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
China	99 1 00285.7	January 28, 1999	☒ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO

Combined Declaration For Patent Application and Power of Attorney (Continued)

Includes Reference to PCT International Applications)

ATTORNEY S DOCKET NUMBER 4296

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowlege the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)			
PCT/JP00/00402	January 27, 2000				

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(List name and registration number)*

Michael N. Meller - Registration No. 20779
Eugene Lieberstein - Registration No. 24645

Send Correspondence to: Anderson, Kill & Olick, P.C.
1251 Avenue of the Americas
New York, NY 10020-1182

Direct Telephone Calls to: *(name and telephone number)*
Michael N. Meller, Esq.
(212) 278-1229
Eugene Lieberstein
(212) 278-1307

FULL NAME OF INVENTOR	FAMILY NAME: HAO	FIRST GIVEN NAME: Qinglong	SECOND GIVEN NAME:
RESIDENCE & CITIZENSHIP	CITY: Peking 100072	STATE OR FOREIGN COUNTRY: China	COUNTRY OF CITIZENSHIP: China
POST OFFICE ADDRESS	POST OFFICE ADDRESS: 1-45, Zhujiafen, Fengtai Dist.	CITY: Peking	STATE & ZIP CODE/COUNTRY: China 100072
FULL NAME OF INVENTOR	FAMILY NAME: LI	FIRST GIVEN NAME: Pengcheng	SECOND GIVEN NAME:
RESIDENCE & CITIZENSHIP	CITY: Peking 100072	STATE OR FOREIGN COUNTRY: China	COUNTRY OF CITIZENSHIP: China
POST OFFICE ADDRESS	POST OFFICE ADDRESS: 1-45, Zhujiafen, Fengtai Dist.	CITY: Peking	STATE & ZIP CODE/COUNTRY: China 100072
FULL NAME OF INVENTOR	FAMILY NAME: XIU	FIRST GIVEN NAME: Qian	SECOND GIVEN NAME:
RESIDENCE & CITIZENSHIP	CITY: Peking 100072	STATE OR FOREIGN COUNTRY: China	COUNTRY OF CITIZENSHIP: China
POST OFFICE ADDRESS	POST OFFICE ADDRESS: 1-45, Zhujiafen, Fengtai Dist	CITY: Peking	STATE & ZIP CODE/COUNTRY: China 100072

see page 2A for 4th inventor

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
Hao Qinglong	Li Pengcheng	XIU Qian
DATE: Sep. 1. 2000	DATE: 9.1.2000	DATE: 9.1.2000

Combined Declaration For Patent Application and Power of Attorney (Continued)

Includes Reference to PCT International Applications)

ATTORNEY S DOCKET NUMBER: 4296

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowlege the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(List name and registration number)*

Michael N. Meller - Registration No. 20779
Eugene Lieberstein - Registration No. 24645

Send Correspondence to:

Anderson, Kill & Olick, P.C.
1251 Avenue of the Americas
New York, NY 10020-1182

Direct Telephone Calls to: *(name and telephone number)*

Michael N. Meller, Esq.
(212) 278-1229
Eugene Lieberstein
(212) 278-1307

204 FULL NAME OF INVENTOR	FAMILY NAME: OGURA	FIRST GIVEN NAME: Atsushi	SECOND GIVEN NAME:
RESIDENCE & CITIZENSHIP	CITY: Tokyo 183-0023	STATE OR FOREIGN COUNTRY: Japan	COUNTRY OF CITIZENSHIP: Japan
POST OFFICE ADDRESS	POST OFFICE ADDRESS: Meijiseimei Fuchu Bldg.40	CITY: Miyamachi 1-chome, Fuchu-shi	STATE & ZIP CODE/COUNTRY: Tokyo 183-0023, Japan
205 FULL NAME OF INVENTOR	FAMILY NAME: GAO	FIRST GIVEN NAME: Jingfeng	SECOND GIVEN NAME:
RESIDENCE & CITIZENSHIP	CITY: Peking 100072	STATE OR FOREIGN COUNTRY: China	COUNTRY OF CITIZENSHIP: China
POST OFFICE ADDRESS	POST OFFICE ADDRESS: 1-45, Zhujiafen, Fengtai Dis.	CITY: Peking	STATE & ZIP CODE/COUNTRY: China 100072
FULL NAME OF INVENTOR	FAMILY NAME:	FIRST GIVEN NAME:	SECOND GIVEN NAME:
RESIDENCE & CITIZENSHIP	CITY:	STATE OR FOREIGN COUNTRY:	COUNTRY OF CITIZENSHIP:
POST OFFICE ADDRESS	POST OFFICE ADDRESS:	CITY:	STATE & ZIP CODE/COUNTRY:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 204	SIGNATURE OF INVENTOR 205	SIGNATURE OF INVENTOR 203
Atsushi Ogura	Gao Jingfeng	
DATE: Sep. 7. 2000	DATE: 9.1.2000	DATE: